

Release Notes

HP StorageWorks

HSG80 Enterprise Modular Storage RAID Array Fibre Channel Solution Software

V8.8

for Windows NT, Windows 2000, and
Windows Server 2003 (32-bit)

Product Version: 8.8-1

First Edition (March 2005)

Part Number: AA-RV1YA-TE

This document contains last-minute and supplemental information about your Solution Software. In the event of conflicting information between these Release Notes and other documents contained in this product release, the Release Notes content takes precedence. For the latest version of these Release Notes and other product documentation, visit the HP web site at <http://h18006.www1.hp.com/products/storageworks/acs/documentation.html>.



© Copyright 2000-2005 Hewlett-Packard Development Company, L.P.

Hewlett-Packard Company makes no warranty of any kind with regard to this material, including, but not limited to, the implied warranties of merchantability and fitness for a particular purpose. Hewlett-Packard shall not be liable for errors contained herein or for incidental or consequential damages in connection with the furnishing, performance, or use of this material.

This document contains proprietary information, which is protected by copyright. No part of this document may be photocopied, reproduced, or translated into another language without the prior written consent of Hewlett-Packard. The information contained in this document is subject to change without notice. The only warranties for HP products and services are set forth in the express warranty statements accompanying such products and services. Nothing herein should be construed as constituting an additional warranty. HP shall not be liable for technical or editorial errors or omissions contained herein.

Compaq Computer Corporation is a wholly-owned subsidiary of Hewlett-Packard Company.

Microsoft®, MS-DOS®, MS Windows®, Windows®, and Windows NT® are U.S. registered trademarks of Microsoft Corporation.

UNIX® is a registered trademark of The Open Group.

Hewlett-Packard Company shall not be liable for technical or editorial errors or omissions contained herein. The information is provided "as is" without warranty of any kind and is subject to change without notice. The warranties for Hewlett-Packard Company products are set forth in the express limited warranty statements for such products. Nothing herein should be construed as constituting an additional warranty.

Printed in the U.S.A.

HSG80 Enterprise Modular Storage RAID Array Fibre Channel Solution Software V8.8 for
Windows NT, Windows 2000, and Windows Server 2003 (32-bit) Release Notes
First Edition (March 2005)
Part Number: AA-RV1YA-TE

Release Notes Contents

This document covers the following major topics:

- [Intended Audience](#), page 4
- [Conventions](#), page 4
- [Abbreviations and Acronyms](#), page 5
- [Release Package Contents](#), page 6
- [Upgrading ACS](#), page 8
- [Multiple Storage System Types](#), page 9
- [ACS Enhancements and Fixes](#), page 10
- [Solution Software Updates](#), page 28
- [Documentation Updates](#), page 29
- [Hardware and Software Support](#), page 30
- [ACS Feature Support](#), page 41
- [Host Operating System Notes](#), page 43
- [Disk Resource Pending Timeout for Large Configurations](#), page 43
- [ACS Anomalies](#), page 52

Intended Audience

This document is intended for storage administrators and HP authorized service personnel who install and maintain HP StorageWorks Enterprise or Modular Storage RAID Array products that include HP StorageWorks HSG80 RAID Array Controllers.

Conventions

The following conventions are used throughout this document:

- Unless otherwise specified, all references to controllers or array controllers imply the HP StorageWorks HSG80 RAID Array Controller.
- Unless otherwise specified, all references to HP StorageWorks Array Controller Software V8.8-1 imply the released HP StorageWorks ACS V8.8-1 code or subsequently patched versions of ACS V8.8-1.
- For the purpose of this document, Enterprise and Modular Storage RAID Array refers to the following HP StorageWorks RAID Array products:
 - Fibre Channel RAID Array 8000 (RA8000)
 - Enterprise Storage Array 12000 Fibre Channel (ESA12000)
 - Modular Array 8000 Fibre Channel (MA8000)
 - Enterprise Modular Array 12000 Fibre Channel (EMA12000)
 - Enterprise Modular Array 16000 Fibre Channel (EMA16000)

Abbreviations and Acronyms

The following abbreviations and acronyms are used throughout this document:

- **ACS**—Array Controller Software
- **CCL**—Command Console LUN
- **CLI**—Command Line Interpreter
- **EISA**—Extended Industry Standard Architecture
- **EMU**—Environmental Monitoring Unit
- **EVA**—Enterprise Virtual Array
- **FC**—Fibre Channel
- **FC-AL**—Fibre Channel - Arbitrated Loop
- **FC-SW**—Fibre Channel - Switched
- **FRU**—Field-Replaceable Unit
- **HBA**—Host Bus Adapter
- **LUN**—Logical Unit Number
- **LVD**—Low Voltage Differential
- **MSCS**—Microsoft Cluster Server
- **NVRAM**—Non-Volatile Random Access Memory
- **PCMCIA**—Personal Computer Memory Card Industry Association
- **PVA**—Power Verification and Addressing module
- **RAID**—Redundant Array of Independent Disks
- **RETMA**—Radio Electronics Television and Manufacturing Association
- **SAN**—Storage Area Network
- **SBB**—Storage Building Block
- **SCSI**—Small Computer System Interface
- **SMART**—Self-Monitoring Analysis and Reporting Technology
- **SWCC**—HP StorageWorks Command Console
- **VCS**—Virtual Controller Software
- **WWID**—World Wide Identifier
- **WWN**—World Wide Name

Release Package Contents

The Array Controller ACS Kit includes:

- Program (PCMCIA) card
- Cover letter

Additional documentation, including white papers and best practices documents, are available through the HP web site at:

<http://h18006.www1.hp.com/products/storageworks/acs/index.html>.

This HSG80 Fibre Channel Solution Software Kit consists of the following:

- The HSG80 Solution Software documentation set which includes:
 - *HSG80 ACS Solution Software V8.8 for Windows NT, Windows 2000, and Windows Server 2003 (32-bit) Installation and Configuration Guide*
 - *HP StorageWorks HSG60 and HSG80 Array Controller and Array Controller Software Command Line Interface Reference Guide, EK-G80CL-RA. C01*
 - *HP StorageWorks HSG60 and HSG80 Array Controller and Array Controller Software Maintenance and Service Guide, EK-G80MS-SA.C01*
 - *HP StorageWorks HSG60 and HSG80 Array Controller and Array Controller Software Troubleshooting Guide, EK-G80TS-SA. C01*
 - *HP StorageWorks Command Console Version 2.5 User Guide*
 - *HP StorageWorks Command Console Version 2.5 Release Notes*
 - *Registration and Warranty Package*
 - *HSG80 Enterprise and Modular Storage RAID Array Fibre Channel Solution Software V8.8 for Windows Notes (this document)*
- *HSG80 Modular Storage RAID Arrays Solution Software V8.8 for Windows NT, Windows 2000, and Windows Server 2003 (32-bit) (available from <http://h18006.www1.hp.com/products/storageworks/ma8kema12k/kits.html>)*
 - Installation and scripting utilities
 - Device drivers

The following supporting documentation is available from the HP StorageWorks web site <http://h18006.www1.hp.com/products/storageworks/acs/documentation.html>.

- *SAN Design Reference Guide*

- *Enterprise and Modular Storage RAID Array Fibre Channel Arbitrated Loop Configurations Application Note*
- *Model 2100 and 2200 Ultra SCSI Controller Enclosures User Guide*
- *Model 4300 Family Ultra3 LVD Disk Enclosures User Guide*
- *Modular Array Cabinet Restrictions*

Upgrading ACS

To upgrade your ACS firmware to ACS V8.8-1, see the *HP StorageWorks HSG60 and HSG80 Array Controller and Array Controller Software Maintenance and Service Guide*. After you upgrade to ACS V8.8-1, you must then complete specific after-upgrade maintenance checks.



Caution: If you are upgrading to ACS 8.8-1P (HP StorageWorks Data Replication Manager) with active Remote Copy Sets, note the following guidelines:

- Ensure that the latest drivers and that SecurePath V3.0A (Service Pack 1) or SecurePath V3.0B (Service Pack 1) are installed before upgrading.
- Complete a shutdown upgrade if you are running Windows NT, Windows 2000, or IBM AIX. Rolling upgrades are not supported on these platforms. Failure to follow these guidelines can result in undesirable controller upgrade issues.



Caution: It is critical that you follow upgrade instructions as documented in the *HP StorageWorks HSG60 and HSG80 Array Controller and Array Controller Software Maintenance and Service Guide* to prevent data loss or corruption. If at any time you encounter problems during the upgrade, contact your HP support representative.

Multiple Storage System Types

The extended interoperability of the heterogeneous SAN allows you to mix several types of HP StorageWorks storage systems. HP recommends the following configuration rules when different storage products are shared in the same SAN:

- HSG80 ACS V8.8-1 and EVA VCS V2.x or 3.x—Use ACS Solution Software V8.8-1 (includes SWCC V2.5) or EVA V3.0C (includes SSSU).
- HSG80 ACS V8.6 and EVA VCS V2.x—Use ACS Solution Software V8.6 (if SWCC V2.4 components are desired) and VCS V2.0 compatible multi-bus software/drivers.
- HSG80 ACS V8.6 and EVA VCS V2.x or 3.x—Use ACS Solution Software V8.8-1 (includes SWCC V2.5) or EVA V3.0C (includes SSSU).
- HSG80 ACS V8.7 and EVA VCS V2.x or 3.x—Use ACS Solution Software V8.8-1 (includes SWCC V2.5) or EVA V3.0C (includes SSSU).

Note: Any multiple storage system configuration that includes EVA VCS V2.x or 3.x requires multi-bus support. See “[Secure Path Software](#)” on page 36 for compatible Secure Path versions. ACS V8.8-1 compatible Secure Path versions and HBA drivers are compatible with VCS V2.x or 3.x.

Note: Only the drivers contained in this kit are supported by HP. Newer drivers may be available but are not supported.

ACS Enhancements and Fixes

This section covers:

- [New CLI Commands and Switches](#), page 10
- [Other Enhancements](#), page 18
- [ACS Fixes](#), page 23

New CLI Commands and Switches

[Table 1](#) on page 10 lists and describes new Command Line Interface (CLI) commands and switches with this release of ACS V8.8-1.

Table 1: New CLI Commands and Switches

Item	CLI Command or Switch	Description and Background
1.	DEFAULT_ACCESS=ENABLE (default) DEFAULT_ACCESS=DISABLE	Directs the controller to automatically disable or enable connections after creating units through the CLI. This switch is used in conjunction with the SET <i>controller</i> command. Although the HP StorageWorks HSG Element Manager and HP StorageWorks Command Console disable all connections for units created through their respective programs, creating new units through the CLI requires you to manually disable connections.
2.	SHOW ELEVATION_INFO	Combines several existing commands to allow you to output and transfer relevant and helpful controller configuration information needed by HP service representatives before and during a support call.
3.	WWID_ASSIGN storageset LUN_WWID=xx	Assigns World Wide ID (WWID) addresses to storage containers.

Table 1: New CLI Commands and Switches (Continued)

Item	CLI Command or Switch	Description and Background
4.	HOST_REDUNDANT NOHOST_REDUNDANT	<p>Turns on and off the capability to redirect the host to the redundant unit copy for the original requested unit data after the controller is unable to submit data from the original unit to the host. This switch is used in conjunction with the SET <i>unit-number</i> command.</p> <p>In dual-redundant configurations, when a controller in earlier ACS versions was unable to retrieve data from a failed unit upon request from a host, some host systems (particularly Tru64 UNIX with Logical Storage Manager) continuously waited for data to be returned from the controller without automatically retrieving the same data from the dual-redundant unit copy. Simultaneously, the controller continuously attempted to retrieve the data from the failed unit without success.</p>

Table 1: New CLI Commands and Switches (Continued)

Item	CLI Command or Switch	Description and Background
5.	DESTROY_MBR	<p>Removes the 8 MB partition from a presented LUN and destroys the master boot record (MBR) present on new or replacement spares, HP-manufactured disk drives. This switch is used in conjunction with the INITIALIZE command.</p> <p>Previously, Microsoft Windows and Windows NT® host systems, under specific circumstances, adversely created two partitions (an 8 MB partition and then the second partition for the rest of the presented LUN space) after a new, HP-manufactured disk was added to a subsystem and exported to a Microsoft Windows host system.</p> <hr/> <p>Note: The pre-existing partition table, or a <i>master boot record (MBR)</i>, is a designated partition for SMART array controllers.</p> <hr/> <p>When the HSG container is presented by the MS OS to the applications, the MS OS assigns a drive to each partition.</p> <p>With ACS V8.8-1, when adding new disks to a Windows and Windows NT host systems, you can add disks and then initialize them with the INIT device DESTROY_MBR CLI command. At your discretion, partitions can be optionally created at the controller (controller partitioning) or be created at the OS through Disk Administrator as host partitions.</p>

Table 1: New CLI Commands and Switches (Continued)

Item	CLI Command or Switch	Description and Background
6.	FAKE_PR	<p>Note: Use the FAKE_PR switch for maintenance or recovery operations only.</p> <hr/> <p>If set on a unit, allows the controller to signal to host systems implementing persistent reservations that persistent reservations are lost. (Lost persistent reservations can occur as a result of mirrored cache reconfiguration or maintenance activities, such as cache module replacement.) After the FAKE_PR switch is invoked, the host resets persistent reservations against all units in the storage system after the host clears its internal persistent reservation reference database. After successful communication, the host can recreate persistent reservations that were lost.</p> <p>Host systems (such as Tru64 UNIX, V5.x) implementing persistent reservations assume that persistent reservations are never lost under any condition. Changing the mirrored cache setting causes persistent reservations to be lost by the controller because the controller reformats cache memory data structures where persistent reservation data for units reside.</p>

Table 1: New CLI Commands and Switches (Continued)


Item	CLI Command or Switch	Description and Background
7.	REINITIALIZE container-name	<p>Invokes maintenance actions against initialized containers and modifies container metadata. Also modifies the prior device initialization or acts upon storageset attributes before its initialization.</p> <hr/> <p>Note: Issue this command with a valid switch. See the following CLI command switches in this table:</p> <ul style="list-style-type: none"> ■ REINITIALIZE container-name TURNSAVEOFF on page 15 ■ REINITIALIZE container-name SPECIAL_FUNCTION_ONE=INFO on page 15 ■ REINITIALIZE container-name SPECIAL_FUNCTION_ONE=PARTITION on page 16 ■ REINITIALIZE container-name SPECIAL_FUNCTION_ONE=NOPARTITION on page 17 <hr/> <div style="display: flex; align-items: center;">  <p>Caution: Before invoking this command, HP recommends that you record previous controller configuration information for backup purposes.</p> </div> <hr/>

Table 1: New CLI Commands and Switches (Continued)

Item	CLI Command or Switch	Description and Background
8.	REINITIALIZE container-name TURNSAVEOFF	Disables the option to save configuration information for devices that were initialized with the <code>SAVE_CONFIGURATION</code> switch.
9.	REINITIALIZE container-name SPECIAL_FUNCTION_ONE=INFO	<p>Directs the controller to examine RAID5-only containers and report:</p> <ul style="list-style-type: none"> ■ Which devices, if any, have metadata attributes that are inconsistent as a result of sparing operations to RAID5 sets while ACS V8.7-2 or later was running. ■ Which devices have partition flags, no partition flags, or inconsistencies on associated containers. ■ Whether attached units exist, if any. <hr/> <p>Note: Issuing this command displays information for only those containers or units that are online or assigned to the controller from which the command is issued. If you issue this switch with the <code>REINITIALIZE container-name</code> command for a RAIDset on another controller, the following message displays:</p> <p>Error 9620: Information not available on this controller. Enter command on other controller.</p> <hr/>

Table 1: New CLI Commands and Switches (Continued)


Item	CLI Command or Switch	Description and Background
10.	REINITIALIZE container-name SPECIAL_FUNCTION_ONE= PARTITION	<p>Directs the controller to set the partition flag bits on all devices in a container and establishes the container as a partitioned container. This command can only be used with RAIDset containers.</p> <hr/> <p> Caution: Ensure that the container was previously initialized as a partitioned container before using this command. Failure to do so results in loss of access to partitioned data.</p> <hr/> <p>Note: Issuing the SPECIAL_FUNCTION_ONE=PARTITION or the SPECIAL_FUNCTION_ONE=PARTITION switch in dual-redundant controller configurations causes the container ownership to move to the controller from which the REINITIALIZE <i>container-name</i> command was <i>not</i> issued.</p>

Table 1: New CLI Commands and Switches (Continued)

Item	CLI Command or Switch	Description and Background
11.	REINITIALIZE container-name SPECIAL_FUNCTION_ONE= NOPARTITION	<p>Directs the controller to reset the partition flag bits on devices in a container and establishes the container as a non-partitioned container. This command can only be used with RAIDset containers.</p> <hr/> <div data-bbox="791 479 858 545"></div> <p>Caution: Ensure that the container was previously initiated as a non-partitioned container before using this command. Failure to do so results in loss of access to any partitioned data.</p> <hr/> <p>Note: Issuing the SPECIAL_FUNCTION_ONE=PARTITION or the SPECIAL_FUNCTION_ONE=NOPARTITION switch in dual-redundant controller configurations causes the container ownership to move to the controller from which the REINITIALIZE <i>container-name</i> command was <i>not</i> issued.</p> <hr/>
12.	SHOW RAIDSETS SPECIAL_FUNCTION_ONE	<p>Displays a listing of all RAIDset containers and either one of three possible container statuses: Good, Maintenance Recommended, or REPORTED ON THE OTHER CONTROLLER.</p> <hr/> <p>Note: Refer to Chapter 4 of the <i>HP StorageWorks HSG60 and HSG80 Array Controller and Array Controller Software Maintenance and Service Guide</i> for additional details related to this command.</p> <hr/>

Other Enhancements

Host Connection Maximum and New Instance Code, 43036A64

If you exceed the maximum number of host connections (96), ACS now notifies you of the discrepancy. A new instance code, 43036A64, is issued, and if you attempt to add new connections after the maximum number of connections is reached, they are rejected. No other connections can be added until the host connection table is cleared of *stale entries* (inactive connections still listed on the connection table) or some of the existing entries are deleted. See the *HP StorageWorks Array Controller and Array Controller Software Troubleshooting Guide* and the *HP StorageWorks Array Controller and Array Controller Software Command Line Interface Guide* for additional information.

Maximum host connections and new repair action code (6A)

A new repair action code (6A) prompts you to use specific steps to resolve the problem associated with exceeding the maximum number of host connections. Refer to the *HP StorageWorks Array Controller and Array Controller Software Troubleshooting Guide* for additional details.

New ASC and ASCQ code

The following table lists a new ASC and ASCQ code included in this release.

Table 2: New ASC and ACSQ code

ASC Code	ASCQ Code	Description
A0	0B	Connection table is full.

See the for *HP StorageWorks HSG60 and HSG80 Array Controller and Array Controller Software Troubleshooting Guide* for additional information.

Deadman controller restarts

New data has been added to the controller failure information if a Deadman Timer expiration occurs. The following information is now appended to LFC 02DD0104:

Last Failure Parameter [2] Bit Mask of Resource Waiters

Last Failure Parameter [3] Contains the address of the waiter routine.

The addition of this new data provides additional troubleshooting guidance. See the *HP StorageWorks HSG60 and HSG80 Array Controller and Array Controller Software Troubleshooting Guide* for additional information.

SHOW CONNECTIONS *FULL* command and additional screen display information

After entering the `SHOW CONNECTIONS FULL` CLI command, connection details are now displayed at the bottom of the subsequent screen. Information displayed includes maximum allowable connections, number of used connections, number of free connections, and number of rejected connections.

Setting chunk sizes when initializing storagesets

When assigning chunk sizes with the `INITIALIZE RAIDSET CHUNKSIZE=xx` CLI command, ACS now rounds up user-defined chunk sizes to the next number that is evenly divisible by 8 to eliminate the possibility of controller performance issues. Previously, controller performance under some conditions were degraded when the chunk size was not divisible by 8.

Containers with user-defined chunk sizes created prior to this release function as before. This change to the `INITIALIZE RAIDSET CHUNKSIZE=xx` CLI command only impacts those containers created after the ACS V8.8-1 upgrade is implemented on affected controllers.

Current units created with odd numbered cluster sizes still operate normally.

SHOW THIS or OTHER *FULL* CLI command and additional vendor ID information

ACS now displays vendor ID information for the controller after entering a `SHOW THIS CONTROLLER FULL` or `SHOW OTHER CONTROLLER FULL` command from a CLI prompt.

Disk Drive Auto-read-reallocate bit activation

Select disk drives use an auto-read-reallocate (ARRE) function that allows drives to resolve recoverable errors. With this release, all disk drives with a model number beginning with *B* (for example *B00721937*) implement ARRE functionality.

Disk Drive SMART Error Handling

ACS now changes the configuration for the SMART (self-monitoring analysis reporting technology) attribute on disk drives used in HSG60 and HSG80 array controller subsystems. Configuration changes to disk drive SMART attributes now support HP standards. SMART events are now only reported as recovered errors and are reported to the host during normal I/O operations.

ACS Downgrade

With this release, you can downgrade ACS from V8.8-1 to V8.7-1 or V8.6-1 (the base version). No other versions are supported. With this, changes have been made to associated screens. Contact HP support for additional information.

Note: If you are downgrading ACS V8.8-1 and pre-existing patches from V8.6 or V8.7 remain in controller memory, the system downgrades your system to the highest patch level that was previously installed.

Procedural changes when modifying Cache Mirror mode

After entering the CLI command to change the cache operational mode (MIRRORED_CACHE or NOMIRRORED_CACHE), array controllers now display a report showing units with persistent reservations. Following this screen report, the system requires you to determine which units are attached to the same cluster or host before changing the cache configuration. See the *HP StorageWorks Array Controller and Array Controller Software Command Line Interface Guide* for additional information.

Note: Since Tru64 UNIX host systems automatically assume that persistent reservations are never lost and array controllers automatically restructure cache data whenever its operational mode is changed, additional steps must be taken. First, you must associate any one unit with persistent reservations. Then, you must enter the `SET unit FAKE_PR` command to restore persistent reservations that may have been lost. Lastly, you must execute any type of Tru64 UNIX host operation that results in a read to physical unit associated to restore all persistent reservations. Doing this, causes Tru64 UNIX host systems to re-establish unit persistent reservation structures.

Note: Units associated with clusters require that you individually invoke the `SET unit-number FAKE_PR` command against each unit.

Note: Since other operating systems may not re-register their persistent reservation settings with the array controller based upon a single unit's persistent reservation conflict, you must invoke the `SET unit number FAKE_PR` command if there are units with devices not mounted by Tru64 UNIX (that is, units mounted by another supported operating system).

New display information after entering the `DISPLAY RESOURCES` command through VTDPY

After entering the `DISPLAY RESOURCES` command from the *Virtual Terminal Display (VTDPY)* utility prompt, ACS now reports the number of buffers on a specified port, the total number of buffers available, the maximum number of buffers allowed, and the number of sense buffer structures remaining. Refer to the *HP StorageWorks HSG60 and HSG80 Array Controller and Array Controller Software Troubleshooting Guide* for additional details regarding this change.

New display information after entering the `DISPLAY HOST` command through VTDPY

Incremental tallies of SFS buffer warnings are now displayed after you enter the `VTDPY DISPLAY HOST` command. Refer to the *HP StorageWorks HSG60 and HSG80 Array Controller and Array Controller Software Troubleshooting Guide* for additional details regarding this change.

New Fault Management Utility commands and switches

[Table 3](#) summarizes new *Fault Management Utility (FMU)* commands associated with this update. These new commands are documented in detail in the *HP StorageWorks HSG60 and HSG80 Array Controller and Array Controller Software Troubleshooting Guide*.

Table 3: New FMU Commands and Switches

Item	FMU Command or Switch	Description
1.	<code>SHOW RESERVATIONS ALL</code> <code>SHOW RESERVATIONS unit number</code>	Displays reservations that exist on one or more units.

Table 3: New FMU Commands and Switches

Item	FMU Command or Switch	Description
2.	SHOW DEVICE_INFO <i>unit</i> SHOW DEVICE_INFO <i>ALL</i>	Displays specific disk information, such as port number, target number, model ID, firmware version, model serial numbers, device flags, and metadata details.
3.	SHOW DEVICE_ERRORS CLEAR DEVICE_ERRORS	Displays device errors and store a log of events in the controller non-volatile memory (NVMEM).
4.	SHOW LAST ALL	Displays pertinent information relative to a controller crash and can be used by an HP service representative to help identify the cause of a controller crash. This command invokes the SHOW LAST ALL <i>FULL</i> FMU command.

ACS Fixes

Table 4 summarizes fixes made to ACS with this release.

Note: Fixes involving Last Failure Codes are very specific, and they address a specific cause for many controller issues; however, fixes for other conditions may exist for that same LFC code.

Table 4: ACS fixes

Item	Subject	Description
1.	WWID loss on remote copy sets during DRM site failover	The problem involving the loss of the initiator WWID on remote copy set (RCS) units after a site failover to target site, and then to a controller failover has been resolved.
2.	New LFC OE199001 and updates to Repair Code 90	<p>Issues on DRM systems that cause a surviving controller to become inoperative after a <i>Field Replace Utility (FRUTIL)</i> replacement controller has been inserted, resulting in a LFC=01942088, has been resolved. The controller failure associated with this issue was recursive.</p> <p>Repair Code 90 has updated troubleshooting steps to handle the following Recursive Bugcheck error scenarios:</p> <ul style="list-style-type: none"> An internal software structure for a write history log unit has been detected inconsistent on "this controller" (the controller that failed). <p>For this condition, the prior firmware (V8.7 and earlier) would have recursively failed with a trace similar to the following:</p> <p>Controller LFC = 01942088 crash. PDAL recursive crash near PC = C016F144 PARAM(7) = 0x00000A1C</p> <p>The controller would have then halted with LED (hex) 25 in the LED codes.</p> <p>With V8.8-1, "this controller" (the controller that failed) comes up misconfigured so that it can avoid a recursive bug check failure.</p> <ul style="list-style-type: none"> Occasionally, recursive controller inoperability problems propagated to the bottom controller during <i>FRUTIL</i> operations in HP StorageWorks Continuous Access.

Table 4: ACS fixes (Continued)

Item	Subject	Description
	New LFC OE199001 and updates to Repair Code 90 (continued)	Follow these steps to troubleshoot the above Recursive Bugcheck error scenarios: 1. On "the other" controller, SET NOFAILOVER. 2. Issue a SET MULTIBUS_FAILOVER COPY=THIS from "the other" controller that did not fail. Note that there is a unit that is inoperative. Take corrective steps to resolve that unit.
3.	Host inoperability and time-consuming events	Delays have been implemented into ACS during time-consuming events to prevent host inoperability issues.
4.	Host aborts and OpenVMS load	ACS improvements have been made to reduce the number of aborts occurring under conditions of heavy I/O loads.
5.	Handling of SMART errors on a device while RUN CONFIG operations is executing	Issues surrounding SMART errors while the RUN CONFIG command is running have been resolved.
6.	SMART error eject flag	ACS has been fixed to ensure that the SMART error eject flag is treated symmetrical across both controllers after FRUTIL operations.
7.	Management enable flag	ACS has been fixed to ensure that the management enable flag is treated symmetrical across both controllers after FRUTIL operations.
8.	Bad disk drives moving from a failedset to a spareset	An issue involving a defective disk drive being inadvertently moved from the failedset to the spareset has been resolved.
9.	Clone utility and controller memory leaks	The issue involving controller memory resource leaks while the CLONE utility is executing has been resolved.
10.	Controller inoperability during controller replacement (LFC 011C010)	The issue involving controller inoperability on the surviving controller during the installation of a new controller while using FRUTIL and resulting in Last Failure Code (LFC) 011C010 (LED Code 25) is fixed.
11.	Disk drive error handling improvement	ACS has been fixed to substantially reduce issues surrounding controller inoperability problems resulting from the installation of bad disk drives into a subsystem.

Table 4: ACS fixes (Continued)

Item	Subject	Description
12.	Controller inoperability and LFC 64030104	With this ACS version, there is no longer a conflict with the use of the previously unsupported <code>SET HOST/SCSI OpenVMS</code> command. Additionally, Issues surrounding controller inoperability problems which resulted from two different entities executing send and receive diagnostic commands to the controller and resulting in LFC 64030104 has been resolved.
13.	Controller inoperability due to LFC 018F2087	The issue involving controller inoperability problems while using <code>FRUTIL</code> which resulted in LFC 018F2087 has been resolved.
14.	Controller inoperability due to metadata errors with single-member mirror sets and LFC 12000103 on both controllers	An issue involving a controller inoperability event, as a result of an unrecoverable read on container metadata (medium error) and the mirror unit, is a single member mirror. The controller failure is recursive, with an LFC 12000103 reason code. A new and unique reason code with a new repair action has been created. The recursive failure has been eliminated, and now, after the controller restarts, access to the rest of the storage occurs. The Repair Code directs activities necessary to recover the unit impacted by the device metadata read issue. Note: If a mirrorset member is added to a current single member mirrorset, the controller completely reads the metadata to validate that the mirrorset is without error. If the controller is under a heavy I/O load (near 0% idle) while the controller validates mirrorset metadata, it can take up to 4 or 5 minutes (on 146 GB drives) to read the metadata before adding the new member to the single member mirrorset. If the mirrorset member is smaller, the amount of time it takes to validate mirrorset metadata is reduced proportionally. If no load exists on the controller, the metadata check completes within 2 to five seconds.
15.	Controller ejecting devices after bus device resets	ACS now ejects any device (if a member of the redundant storageset) that is responsible for excessive controller-initiated SCSI bus resets.

Table 4: ACS fixes (Continued)

Item	Subject	Description
16.	Adding unit above non-partitioned R5 set and receiving Error 1170: Partitions found on container, unit not created.	This issue has been resolved for most cases. If there is an error noted when this is attempted, refer to the <code>REINITIALIZE</code> command in the <i>HP StorageWorks HSG60 and HSG80 Array Controller and Array Controller Software Command Line Interface Reference Guide</i> for help.
17.	Using the <code>RUN CONFIG</code> command while bad disk drives exist and LFC 83030100	The <code>RUN CONFIG</code> command has been improved and now skips bad disk drives after the command is submitted and completes its routine. Previously, the controller would fail with LFC 83030100. The system reports the following diagnostic error information: DEVICE AT P1:T4:L0 failed initialization, Skipping Device
18.	Controller failure and LFC 44650100	With previous ACS versions, controller restarts that resulted in the issuance of LFC 44650100 occurred if the controller encountered certain workloads (for example, large writes outstanding to the controller). This issue is resolved.
19.	Device error handling	ACS has been improved to better handle device errors and inconsistent drive behavior. ACS more readily ejects drives under failure conditions to the failedset if the container is redundant.
20.	Spontaneous controller restarts on snapshot	Controller restarts attributed to Intel i960 processor, PCI Data or Address Line (PDAL), and Cache Data and Address Line (CDAL) events occurred if heavy I/O load to source units of a snapshot existed. This issue is resolved with this release.
21.	Intermittent LUN failures	Under some conditions, LUNs failed to respond to SCSI inquiries. This issue is resolved with this release.

Table 4: ACS fixes (Continued)

Item	Subject	Description
22.	Controller port TACHYON chip malfunction	With earlier versions of ACS, controller port TACHYON chip lock-ups occurred. Issuing the <code>DISPLAY HOST Virtual Terminal Display (VTDPY)</code> command, in some cases, reset the port. With this release, ACS employs an automatic port reset.
23.	Excessive abort messages logged by the host	Under excessively high I/O rates, which included large transfers, host systems occasionally aborted previous work queued to the controller due to considerable controller activity. This issue was further complicated by the use of partitioned containers and path switches. With this release, host systems initiate a fewer number of aborted I/Os.
24.	Fibre Channel (FC) switch goes port INSYNC state to HSG	Prior to this release, resource leaks occurred if a controller processed PLOGI frames against the rejected host list while the connection table was locked. The controller would report that all port conditions were <code>Good</code> . The FC switches would report as being in the <code>INSYNC</code> state for connections to one or more controller ports. Consequently, this condition could not be cleared through <code>VTDPY</code> . This issue is resolved with this release.

Solution Software Updates

The following updates are included in this version:

- Qualified Solution Software V8.8-1 with ACS V8.8-1 and the components defined in these Release Notes.
- Added support for HP StorageWorks 64-bit, 2 Gbps PCI-X FC HBA 3R-A3751-AA (281541-B21) HBA FCA2214, driver v8.2.0.73, Firmware loaded from driver, BIOS V1.34.
- Added support for HP StorageWorks 64-bit, 2 Gbps PCI-X FC, dual channel HBA 3R-AA428-AA (321835-B21) HBA FCA2214DC, driver v8.2.0.73, Firmware loaded from driver, BIOS V1.34.
- Upgraded HBA drivers for Windows NT, Windows 2000, and Windows Server 2003 (32-bit) to V4-4.82a16 (NT) and V5-4.82a16 (W2K and WS2003 (32-bit)).
- Reestablished support for HP StorageWorks DS-KGPSA-BC PCI FC HBA.
- Added support for Windows 2000 Service Pack 3 and 4.
- Windows 2000 Datacenter support is not included in this release.
- The Solution Software installation program can now perform silent installations, which automates the installation process. See the HP StorageWorks HSG80 ACS Solution Software Installation and Configuration Guide for more information.
- The Solution Software now provides a Component Identifier program that gives the user a quick method for identifying storage components. See the Readme.txt in the kit for more information.
- Added support for ProLiant Essentials Rapid Deployment Pack for ProLiant servers.

Documentation Updates

The following documentation changes were made in order to consolidate and reduce the number of documents associated with V8.8-1 Solution Software:

- The section "FC Switch Updates" was removed along with the Fibre Channel Switch Support table. Switch support information is available in the *HP SAN Design Reference Guide* at <http://h18006.www1.hp.com/storage/saninfrastructure.html>.
- New document *Enterprise and Modular Storage RAID Array Fibre Channel Arbitrated Loop Configurations Application Note* consolidates prior release, host-specific FC-AL application notes into a single, multivendor document for FC-AL configurations. This document supersedes the following application notes:
 - *Enterprise and Modular Storage RAID Array FC-AL HA Configurations for Windows NT/Windows 2000 - Intel Application Note*, Part Number: AA-RHOSE-TE
 - *Enterprise and Modular Storage RAID Array FC-AL Configurations for Windows NT/Windows 2000 Application Note*, Part Number: AA-RHORC-TE
- The following documents were incorporated into the *HP StorageWorks HSG80 ACS Solution Software Installation and Configuration Guide*:
 - *Enterprise and Modular Storage RAID Array Fibre Channel Cluster for Windows NT/Windows 2000 Installation Guide*
 - *Installing the Integration Patch for Compaq Insight Manager and ACS V8.6 or Later*

The following changes were made to the general content of these Release Notes since they were last published:

- A new section, "[Multiple Storage System Types](#)" on page 9, was added to address basic configuration rules used in mixing different HP StorageWorks products in the same SAN.
- A new section, "[ACS Feature Support](#)" on page 41, was added to assist customers who wish to extend the interoperability of their SAN.
- The section "[Layered Software Applications](#)" on page 36, was updated.
- The section "[Disk Device Support](#)" on page 30, was updated.
- The section "System Components", page 31, was updated.

- “[Reestablishing Host Connections After Upgrading DS-KGPSA-BC Firmware](#)” on page 44 section and procedures were returned to this document since support of this HBA was reestablished.
- A new section “[Disk Resource Pending Timeout for Large Configurations](#)” on page 43, was added to ensure continuous operation of Disk Resources across SAN perturbations with Disk Resource counts greater than eight.

Hardware and Software Support

This section lists the hardware, devices, and operating system versions that are compatible with this Fibre Channel Solution Software Kit.

Array Hardware Support

ACS V8.8-1 is the firmware component of the HP StorageWorks HSG60 and HSG80 array controllers. When configured in one of these controllers, ACS supports the following storage arrays: MA8000, EMA12000, EMA16000, MA6000, RA8000, ESA12000 storage systems.

Additional information regarding hardware specifications can be found at <http://h18006.www1.hp.com/products/storageworks/acs/related.html>.

Disk Device Support

To retrieve the latest list of devices supported with HSG60 and HSG80 array controllers:

1. Go to the following link:
<http://h18006.www1.hp.com/products/storageworks/softwaredrivers/acs/>
2. Select the **manuals (guides, supplements, addendum, etc)** link under self-help resources.
3. Select the **HSG60, HSG80, HSJ80, HSZ80 Supported Disk Drive Matrix** link.

Switch Support

This Fibre Channel Solution Kit supports the Fibre Channel switches and firmware versions listed in the *HP StorageWorks SAN Design Reference Guide* and *SAN Product Support Matrix* at <http://h18006.www1.hp.com/storage/saninfrastructure.html>.

System Components

This Fibre Channel Solution Software Kit supports the system components and operating system versions listed in [Table 6](#).

Table 6: Minimum System Requirements

Component	Requirement
Controller Compatibility	StorageWorks HSG80 Array Controller, ACS V8.8-1 (or a subsequently patched version of ACS V8.8-1)
Platform	Intel X86, ProLiant X86, and ProLiant BL20p and BL40p Blade Servers
Operating System	<ul style="list-style-type: none">■ Microsoft Windows NT 4.0, Service Pack 6A (does not support blade servers)■ Microsoft Windows 2000, Service Pack 3 and 4■ Microsoft Cluster Server■ Microsoft Windows Server 2003 (32-bit)
Topology	Fibre Channel Switched (FC-SW) Fibre Channel Arbitrated Loop (FC-AL)
SCSI Protocol	SCSI-2 SCSI-3 (recommended)
Failover Mode	Transparent (Windows NT and Windows 2000 only) Multi-Bus (requires Secure Path software)
Host Mode	WINNT
Disk Space	5 MB

Table 6: Minimum System Requirements (Continued)

Adapter Compatibility	HP StorageWorks 64-bit, 1 Gbps PCI FC HBA DS-KGPSA-CB (176479-B21), HBA driver V4-4.82a16 (NT) or V5-4.82a16 (W2K and WS2003 (32-bit)), Firmware Version 3.91a1/BIOS Version 1.63a1
	HP StorageWorks PCI FC Host Bus Adapter DS-KGPSA-BC (380574-001), HBA driver V4-4.82a16 (NT) or V5-4.82a16 (W2K and WS2003 (32-bit)), Firmware Version 3.91a1/BIOS Version 1.63a1
	HP StorageWorks 64-bit, 2 Gbps PCI FC HBA 3R-A3515-AA (245299-B21), HBA FCA2101, driver V4-4.82a16 (NT) or V5-4.82a16 (W2K and WS2003 (32-bit)), Firmware Version 3.91a1/BIOS Version 1.63a1
	HP StorageWorks 64-bit, 2 Gbps PCI-X FC HBA 3R-A3751-AA (281541-B21) HBA FCA2214, driver v8.2.0.73, Firmware loaded from driver, BIOS Version 1.34 (W2K and WS2003 (32-bit) only)
	HP StorageWorks 64-bit, 2 Gbps PCI-X FC, dual channel HBA 3R-AA428-AA (321835-B21) HBA FCA2214DC, driver v8.2.0.73, Firmware loaded from driver, BIOS Version 1.34 (W2K and WS2003 (32-bit) only)
	HP StorageWorks 64-bit, 2 Gbps PCI FC HBA 3R-A4214-AA (308540-B21) HBA FCA2355, driver V4-4.82a16 (NT) or V5-4.82a16 (W2K and WS2003 (32-bit)), Firmware Version 3.91a1/BIOS Version 1.63a1 NOTE: Blade server ProLiant BL20p is shipped with an in-built HBA, driver Version 8.2.0.73, BIOS Version 1.34

Notes

- HsxDisk.sys and HszDisk.sys are required drivers for array controller configurations. The Solution Software CD-ROM that came with your kit includes the following versions of these drivers:
 - HszDisk.sys V4.4.0.9 for Windows NT 4.0
 - HsxDisk.sys V5.4.21 for Windows 2000 (used only in transparent failover configurations)

Note: Transparent failover configurations are not supported for Windows Server 2003 (32-bit).

- HS_Service records system errors used in conjunction with remote diagnostics services provided through Proactive Services software.
- If you see a constantly blinking light on your Fibre Channel Switch, the topology setting may be set to arbitrated loop mode on your server. To correct this, remove the existing installation of the Fibre Channel Software and reinstall the desired setup.
- When upgrading firmware on the DS-KGPSA-BC HBA from Versions 2.x to Versions 3.x, follow the procedure in “[Reestablishing Host Connections After Upgrading DS-KGPSA-BC Firmware](#)” on page 44 of these Release Notes.

StorageWorks Command Console (SWCC)

SWCC V2.5 is included in this release and is used to identify the SWCC suite of components.

SWCC provides a graphical user interface that can be used to configure and monitor your storage system. Use of SWCC is highly recommended, but not required. The SWCC Agent is installed as part of the Solution Software Kit.

For more information on SWCC installation, see the HP StorageWorks HSG80 ACS Solution Software Installation and Configuration Guide. For more information on SWCC Client operation, see the *Command Console Version 2.5 User Guide* and the *Command Console Version 2.5 Release Notes*.

SWCC Scalability

- The SWCC Client can monitor up to 128 host systems, each with up to 32 storage systems, for a maximum of 4096 concurrent storage connections and a total of 2.65 PB of storage.
- One Agent can support up to 32 Clients.

Multiple Agents

This Solution Software Kit contains an SWCC Agent that supports controller locking during CLI command execution, which allows support for multiple Agents. This locking feature is required in order to use the Management Appliance in addition to the host-based SWCC Agent. However, it is not recommended or required to use multiple Agents for any other purpose.

Note: SWCC Agent V2.3.2, Build 79 or later supports the locking feature. This release of Solution Software exceeds this requirement.

Multiple Management Sessions

Though multiple Clients can be used to monitor the storage system, HP recommends that only one instance of storage system management be active at a time. The Client allows for multiple management sessions, but there are no ownership rights given to any particular session. Without a highly coordinated effort, multiple management sessions can undermine the integrity of system maintenance. This same principle applies to multiple management sessions initiated through the Management Appliance as well.

SWCC Client Installation

The SWCC client software is installed on your host system from the HP StorageWorks Solution Software CD-ROM.

1. Insert the Solution Software CD-ROM into the host system, or start the installation by browsing to `Launch.exe`. A menu appears on your screen.

The installation program provides one primary option: **Solution Software for Windows**.

2. Click the Driver Install button.
3. Select **SWCC** to install.
4. Select **HSG80 Controller for ACS85 or newer** and complete the installation as prompted.

Secure Path Software

Secure Path is a high availability, multi-bus software application that supports FC-AL and FC-SW connectivity. This Fibre Channel Solution Software Kit supports the Secure Path software shown in [Table 7](#).

Table 7: Secure Path Compatibility

Operating System	Supported Product Version
Windows NT 4.0 Service Pack 6A	V4.0
Windows 2000 Service Pack 3 and 4	See note for blade servers ProLiant BL20p and BL40p V4.0 or higher for all other servers
Windows Server 2003 (32-bit)	See note

Note: For more information on Secure Path software, see the product documentation that comes with the product, or visit the HP web site:
<http://h18006.www1.hp.com/products/sanworks/secure-path/index.html>

Layered Software Applications

Compatibility with HP StorageWorks layered software applications is defined in [Table 8](#).

Table 8: Layered Application Compatibility

Application	Application version	Supported ACS versions and variants
HP SANworks Storage Resource Manager (SRM)	V4.0B	V8.8-1F
HP StorageWorks Command Scriptor	V1.0B	V8.8-1F/S/P
HP OpenView Management Appliance	V1.0C	V8.8-1F/S/P
HP StorageWorks Enterprise Volume Manager (EVM)	V2.0D	V8.8-1F/S/P
HP OpenView Storage Virtual Replicator	V3.0A	V8.8-1F
HP SANworks Network View	V2.0B	V8.8-1F/G/S/P
HP SANworks Storage Allocation Reporter	V1.0D	V8.8-1F

In cases where ACS functional builds other than V8.8-1F are required, ensure that all necessary components for those configurations are at the proper level prior to upgrading your ACS code.

If you use EVM with ACS V8.8-1F, you can use scripting with Snapclones. If you want to create Snapshots with EVM, you must use ACS V8.8-1S or V8.8-1P.

More information and specific product documentation on storage management software is available at the HP StorageWorks website:

<http://h18006.www1.hp.com/storage/software.html>

Solution Software Kit Upgrade Procedures

Use the procedures in this and the following sections to upgrade your Solution Software Kit:

1. Perform backups of data prior to upgrade.
2. Verify operating system versions, and upgrade operating systems to supported versions and patch levels.
3. Upgrade switch firmware.
4. Upgrade the Solution Software Kit.
5. Quiesce all I/O and unmount all file systems for the server being updated before proceeding.
6. If you are installing an operating system that uses Secure Path, upgrade Secure Path to the latest version at this time.
7. Upgrade the ACS software.

Note: Solely for the purpose of performing upgrades to ACS, the Solution Software Kit supports ACS V8.6. HP recommends that you avoid mixing ACS versions in the same Storage Area Network (SAN).

See the following documentation for additional information:

- *HP StorageWorks HSG60 and HSG80 Array Controller and Array Controller Software Maintenance and Service Guide*
- *Solution Software Release Notes—HSG80 Enterprise Modular Storage RAID Array Fibre Channel Solution Software V8.8 for Windows NT, Windows 2000 and Windows Server 2003 (32-bit)*
- The “Upgrading ACS” section for the additional information on upgrades.

Note: If you are upgrading ACS, complete the upgrade after all Windows server updates are finished. Be sure to back up data before updating servers.

These procedures are applicable to only Secure Path V3.1A for Windows (SP 3) or Secure Path V4.0-1 or higher for Windows. To obtain Secure Path V3.1A for Windows (SP 3), visit the HP web site at <http://www.hp.com>. Follow the applicable storage-related links to the software download page. To obtain Secure Path for Windows, contact your HP technical support representative.

Note: For information on updating the Solution Software Kit using transparent failover procedures, see the *HP StorageWorks HSG80 ACS Solution Software Version 8.8 for Windows NT, Windows 2000, and Windows Server 2003 (32-bit) Installation and Configuration Guide*.

New Solution Software Kit V8.8-1 Installation Procedures

To install the Solution Software Kit for the first time, complete the following steps:

1. Ensure that the Fibre Channel Adapter (FCA) is not connected.
2. Download the Solution Software Kit and click **Solution Software for Windows**.
 - a. Click **Perform Multi Driver Update** to install the HBA driver.
 - b. Choose **Multipath** or **Transparent Mode**.
 - c. Click **SWCC** (optional) to install SWCC components.

Note: Do *not* restart the server at this time if instructed to do so.

3. Using your Secure Path Software CD, install Secure Path V3.1A for Windows or Secure Path V4.0-1 or higher for Windows in accordance with the instructions provided with that product. If you are using Secure Path V3.1A, apply the Secure Path V3.1A for Windows SP 3 update.
4. Shut down the server.
5. Connect the FCA fibre cables to the switch(es).
6. Restart the server.

Dynamic Disks

The use of Snapshots and Snapclones in HP SANs is not supported in a Windows 2000 environment if the Snapshot or Snapclone is presented to the same Windows 2000 host as the LUN from which the Snapshot or Snapclone was created. Snapshots and Snapclones are features of the HSG80 and HSV110 controller based HP Storage systems. All Dynamic disks on a system have information in their metadata about the other dynamic disks that exist on the system. When Windows is presented with 2 dynamic disks that have the same information on them, it does not have code to resolve the conflict.

ACS Feature Support

The following sections provide details for specific ACS features.

SCSI-2 to SCSI-3 Migration

In order to extend interoperability within the heterogeneous SAN, HP highly recommends that customers begin migrating from SCSI-2 to SCSI-3 protocols. Moving to SCSI-3 allows greater diversity in the operating systems (OS) and storage products (including EVA) that comprise a SAN.

All migrations from SCSI-2 to SCSI-3 should be planned during scheduled downtime. SCSI migrations require a controller restart and most likely a server restart. Data contained on CCL units needs to be moved to new units once SCSI migration is complete.



Caution: Before attempting a SCSI-2 to SCSI-3 migration, it is extremely important that all data be backed up and that units be available for remapping CCL data. In addition, ensure that all redundant storagesets are in normal (non-reduced) mode.

When migrating from SCSI-2 to SCSI-3, the controller checks for controller unit D0 and does not change modes until D0 (at all presented offsets) is deleted. One or more LUNs are lost after the mode change. If you are planning to move from SCSI-2 to SCSI-3, back up your data first. The data in LUN 0 (and any other offsets that map to LUN 0) that was used in SCSI-2 requires that the data be moved to a different LUN. It may be necessary to retrieve this data from a backup.

Note: If multi-bus failover configurations or server clustering are employed in the environment, there may be additional considerations regarding CCL usage during SCSI migration procedures. Refer to your multi-bus failover or server clustering documentation prior to implementation. In addition, there may be OS-based limitations on SCSI-3 usage to consider, particularly in down-level versions of your OS. Review OS documentation prior to migration.

For more information, see the “What is the Command Console LUN?” and “Assigning Unit Numbers Depending on SCSI_VERSION” sections of Chapter 1 in the HP StorageWorks HSG80 ACS Solution Software Installation and Configuration Guide.

SAN Boot Procedures

Booting from the SAN is supported for Windows NT and Windows 2000. SAN boot procedures are available on the HP web site at

<http://h18000.www1.hp.com/products/storageworks/san/documentation.html>

File System Limitations

Table 9 describes known limitations that certain file systems have regarding storage unit size.

Table 9: File System Storage Unit Limitations

Disk Size	Storage set Configuration	Operating and File System
4 GB	Any	Windows NT4.0/Windows 2000/Windows Server 2003 (32-bit) FAT File System
16 TB	Any	Windows NT 4.0/Windows 2000/Windows Server 2003 (32-bit) NTFS File System

PVA Switch Setting

After installing the EMU in each cabinet, ensure that the SCSI ID number on the PVA is set according to Table 10 (BA370 enclosures only).

Table 10: SCSI ID Number on the PVA

Cabinet	PVA SCSI ID Setting
Master enclosure	0
First expansion enclosure	2
Second expansion enclosure	3

Disk Resource Pending Timeout for Large Configurations

In order to ensure continuous operation of Disk Resources across SAN perturbations with Disk Resource counts greater than eight, it is recommended that the Pending Timeout parameter for each Disk Resource be increased from 180 seconds to 360 seconds.

To view and set the Pending Timeout parameter:

1. Open the **Microsoft Cluster Administrator**.
2. Select a **Disk Group** resource in the left pane.
3. Right click each Disk Resource in right pane, one at a time, and select **Properties**.
4. Select the **Advanced** tab from the **Properties** menu.
5. Locate the **Pending Timeout** value and change it to **360**.
6. Click **OK**.

SWCC SCSI Connection

The SWCC Client SCSI connection can sometimes produce the following error message when trying to connect through the CCL:

```
Error scanning subsystem. Command Execution Error:  
[DeviceIOControl Error:]
```

Additionally, physical devices may not appear in the **Select Device** drop-down list. The SWCC CLI Window terminates if the **New Window** icon is selected, or if **New** is selected from the **File** Menu, followed by clicking the **Cancel** button on the **Connection Selection** dialog box. If the connection becomes lost, restart the Client application.

HP strongly recommends that you use the SWCC Agent to manage the storage system.

Host Operating System Notes

The following section lists host-specific operating notes.

Host Operating System Support of Multi-Bus Failover

Multi-bus failover is supported on the Windows NT, Windows 2000, and Windows Server 2003 (32-bit) operating system through the use of Secure Path software. See “[Secure Path Software](#)” on page 36, for version compatibility and restrictions.

Reestablishing Host Connections After Upgrading DS-KGPSA-BC Firmware

V3.x firmware is Fibre Channel Standard compliant and uses a different World Wide Name (WWN) for Host and Port (2xxx-xxxx-xxxx-xxxx format for Host and 1xxx-xxxx-xxxx-xxxx for Port, where xxx-xxxx-xxxx-xxxx is identical in both).

After upgrading the DS-KGPSA-BC HBA firmware from V2.x to V3.x, the new WWN structure may create new host connections on the HSG80 controllers for the HBA, thereby marking the original host connections “offline” and no longer usable.

To maintain server access to storage units behind the HSG80 controllers, change the storage units’ access to use the new host connections:

1. Connect a PC or terminal to the maintenance port of Controller A and get a listing of the host connections by typing the command:

```
HSGA> SHOW CONNECTIONS
```

The resulting display should appear similar to the following:

Connection Unit

```
Name Operating system Controller Port Address Status Offset
!NEWCON68 WINNTVMSTRU64_UNIX OTHER 2 021900 OL other 0
HOST_ID=2000-0000-C920-A562 ADAPTER_ID=1000-0000-C920-A562
!NEWCON69 WINNTVMSTRU64_UNIX THIS 1 021900 OL this 0
HOST_ID=2000-0000-C920-A562 ADAPTER_ID=1000-0000-C920-A562
!NEWCON70 WINNTVMSTRU64_UNIX THIS 1 011800 OL this 0
HOST_ID=2000-0000-C921-4D3D ADAPTER_ID=1000-0000-C921-4D3D
!NEWCON71 WINNTVMSTRU64_UNIX OTHER 2 011800 OL other 0
HOST_ID=2000-0000-C921-4D3D ADAPTER_ID=1000-0000-C921-4D3D
W2K01A-A1 WINNTVMSTRU64_UNIX THIS 1 011800 offline 20
HOST_ID=1000-0000-C921-4D3D ADAPTER_ID=1000-0000-C921-4D3D
W2K01A-B2 WINNTVMSTRU64_UNIX OTHER 2 011800 offline 20
HOST_ID=1000-0000-C921-4D3D ADAPTER_ID=1000-0000-C921-4D3D
W2K01B-A2 WINNTVMSTRU64_UNIX THIS 1 offline 20
HOST_ID=1000-0000-C920-A562 ADAPTER_ID=1000-0000-C920-A562
W2K01B-B1 WINNTVMSTRU64_UNIX OTHER 2 offline 20
HOST_ID=1000-0000-C920-A562 ADAPTER_ID=1000-0000-C920-A562
W2K02A-A1 WINNTVMSTRU64_UNIX THIS 1 021800 OL this 40
HOST_ID=1000-0000-C921-4F5E ADAPTER_ID=1000-0000-C921-4F5E
```

2. Note the WWNs of the ADAPTER_ID of the new connections.
3. Find the offline connections with the same ADAPTER_ID WWNs and note the unit offsets.
4. Type the following command to get a list of all storage units and the host connections whose access is enabled:

```
HSGA> SHOW UNIT FULL
```

5. Type the following commands for:

```
HSGA> SET <unit name> DISABLE_ACCESS=<offline host connection
name #1>
```

```
HSGA> SET <unit name> DISABLE_ACCESS=<offline host connection
name #2>
```

```
...
```

6. Delete the offline host connections by typing:

```
HSGA> DELETE <offline host connection name #1>
```

```
HSGA> DELETE <offline host connection name #2>
```

...

7. Rename the new connections to the name of the previously matching offline host connection name by typing:

```
HSGA> RENAME !NEWCONnn <offline host connection name #1>
```

```
HSGA> RENAME !NEWCONnn <offline host connection name #2>
```

...

8. Enable access for these new host connections to the storage units by typing:

```
HSGA> SET <unit name> ENABLE_ACCESS=<offline host connection  
name #1>
```

```
HSGA> SET <unit name> ENABLE_ACCESS=<offline host connection  
name #2>
```

...

Windows NT, Windows 2000, and Windows Server 2003 (32-bit) Notes

- Windows NT, Windows 2000, and Windows Server 2003 (32-bit) can run MSCS software. See documents that come with Microsoft's software kits for instructions on setting up Microsoft clusters.
- There is no Hot Plug support for FC HBAs under Windows NT 4.0, Windows 2000, and Windows Server 2003 (32-bit) at this time. Check the HP Support web site for updates.
- Windows NT and Windows 2000 support SCSI-2 and SCSI-3 modes. See the *HP StorageWorks HSG80 ACS Solution Software Installation and Configuration Guide* that comes with this kit for more information.
- HP recommends that you load software directly from the Solution Software CD-ROM when installing drivers and running the Fibre Channel Setup utility. You may experience problems on some systems if you first copy the CD-ROM contents to a disk drive and then install from there.
- Windows 2000 dynamic volumes are supported in transparent failover configurations or in Secure Path V4.0x multi-bus configurations.
- Cloning a Windows 2000 dynamic disk is allowed. However, either the Clone or the original can be mounted to the same host but not both.

Windows NT Specific Notes

- Fibre Channel software setup handles HszDisk and HS_Service installation. This is sometimes referred to as HSZinstall in the documentation.

Note: Do not use the Large LUN model with Windows NT Service Pack 5 under any circumstances. Windows NT Service Pack 6A is the stated minimum for this Solution Software.

- In a situation where you are replacing a server with another and using the existing drives (storage sets) behind the array controllers, you may find drive to drive letter mapping changes. During such a system changeover, remap drives to drive letters using the Disk Administrator to restore proper access to your data.

- To delete the 8 MB EISA-type partition on new disk drives, as discussed in the “[Disk Device Support](#)” on page 30, create a unit and delete the partition in Disk Administrator.

Windows 2000 Specific Notes

- New Universal Disk Drives (or units that are migrated from SmartArray controllers usage) being configured into storageset members need to be initially written to with DILX (a diagnostic utility on the HSG storage systems). DILX only operates on units. Therefore, the new disks must be configured into a unit prior to running DILX. Optionally, the HSUTIL format disk utility may be used on a disk device.
- The Fibre Channel Setup utility installs HS_Service and HsxDisk software components. These are similar to HS_Service and HszDisk in the Windows NT setup procedure.
- There are two situations in which drive-letter remapping might occur and that could affect access to data by programs you may need to run. The first situation is one in which you replace one server with another. The second is a situation in which you simply replace an FC HBA in one of your systems. During such a system or adapter changeover, be sure to manually remap drives to drive letters using Disk Manager. This restores proper access to your data.
- If you replace an FC HBA in a server, you need to reinstall the HBA driver and then rerun the Fibre Channel Setup utility. This is so that Windows 2000 can automatically reload the original driver for this adapter and reset many of the important registry settings. New connections are created on the HSG controller. Those connections should be renamed and assigned to the appropriate units.

For more information about installing the adapter, see the HP StorageWorks HSG80 ACS Solution Software Installation and Configuration Guide and use the software on the Solution Software CD-ROM.

Upgrading from Windows NT 4.0 to Windows 2000 or Windows Server 2003 (32-bit)

If you are upgrading from Windows NT 4.0 to Windows 2000 or Windows Server 2003 (32-bit), you must remove the software components installed by the previous version of the Fibre Channel Setup utility. Follow these steps:

1. Remove the software components installed from the previous Fibre Channel Setup utility. To do this, locate the previous CD-ROM and run the utility. Follow the procedures in it to remove components. Alternately, you can use the **Add/Remove Programs** applet.
2. Upgrade from Windows NT 4.0 to Windows 2000 or Windows Server 2003 (32-bit) as instructed by Microsoft's documentation.
3. Reboot.
4. Install the HBA driver upgrade as instructed in the HP StorageWorks HSG80 ACS Solution Software Installation and Configuration Guide.
5. Run the Fibre Channel Setup utility to complete your installation.

Registry Growth in Windows

The Windows plug-and-play architecture has a limitation on the number of plug-and-play device entries that can be added to the registry. Whenever devices are added or removed, or Snapshot is created or deleted, entries are added to the registry by the Plug-and-Play manager, potentially causing the registry to grow beyond the allowed capacity.

If more than 700 entries are in the registry, the next time the system reboots for any reason, the following error message occurs before the operating system boots up:

```
"Failed to load Windows 2000 due to a file missing or corrupt in  
the \WINNT\SYSTEM32\CONFIG\SYSTEM directory."
```

Refer to the Microsoft Knowledge Base article (Q269075), which provides more information about the registry growth problem.

Large LUNs for Windows NT and Windows 2000

Enabling Large LUNs allows a Windows NT or Windows 2000 server to have access to LUNs beyond the 0-7 range, and to access more than 8 LUNs per target. The host can access unit D10 by leaving the connection offset at 0.

The maximum number of LUNs supported is 128 per storage system. If you are using Secure Path V3.1A SP1, the maximum number of LUNs is 64 per storage system. If you are using Secure Path V4.0x, the maximum number of LUNs is 128 per storage system. The LUNs can be contiguous or non-contiguous.

Note: Large LUNs are supported on Windows NT, Windows 2000 Server, and Windows 2000 Advanced Server.

The chart below indicates cases in which Large LUNs are enabled.

	ACS V8.5		ACS V8.6/8.8-1	
	WNT	W2000	WNT	W2000 *WS2003 (32-bit)
SCSI-2 LUN 0 present	Y	Y	Y	Y
SCSI-2 LUN 0 not present	N	N	N	Y
SCSI-3 LUN 0 always present	Y	Y	Y	Y

Y = functional

N = not functional

Controller Configuration

It is recommended that you set the SCSI_VERSION to SCSI-3 for maximum availability.

- Multi-bus failover mode (with Secure Path V3.1A SP1)—Support for 64 LUNs per storage system (SCSI-2 mode) or 63 LUNs + 1 CCL (SCSI-3). These LUN numbers must be between 0 and 63.
- Multi-bus failover mode (with Secure Path V4.0x)—Support for 128 LUNs per storage system (SCSI-2 mode) or 127 LUNs + 1 CCL (SCSI-3). These LUN numbers must be between 0 and 199.
- Transparent failover mode—Support for 128 LUNs per storage system (SCSI-2 mode) or 127 LUNs + 1 CCL (SCSI-3). These LUN numbers must be between 0 and 199.

Known Limitations

In Windows 2000, if any LUN greater than 7 is removed and a subsequent disk rescan is performed, the **Found New Hardware** wizard may ask you to finish the installation of the device that was removed. The Device Manager may show the device with a yellow warning icon on it. A reboot of the system completely removes the device.

ACS Anomalies

If you issue the `INITIALIZE SAVE_CONFIGURATION CLI` command on a JBOD disk to save the controller configuration while the unit is not above the container, the command appears to work, but the save operation does not occur. You must place the unit above the JBOD, and then issue the `INITIALIZE SAVE_CONFIGURATION` to accomplish this task.